SAMPLE MATERIAL

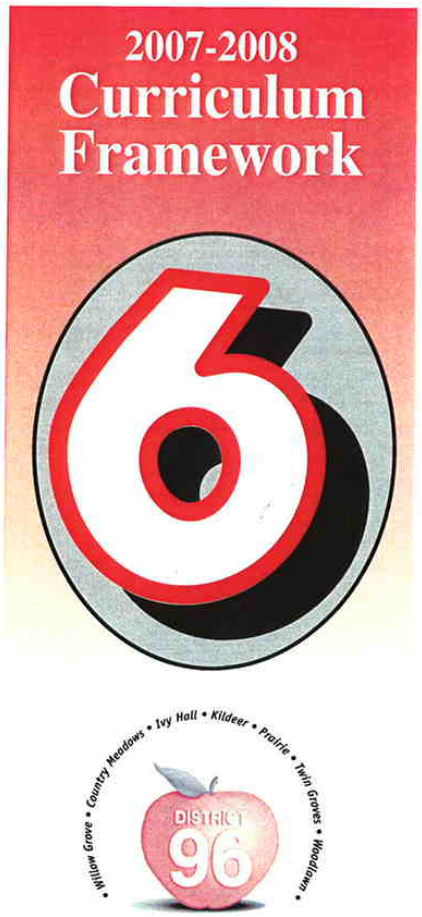
Power Standards for Middle School

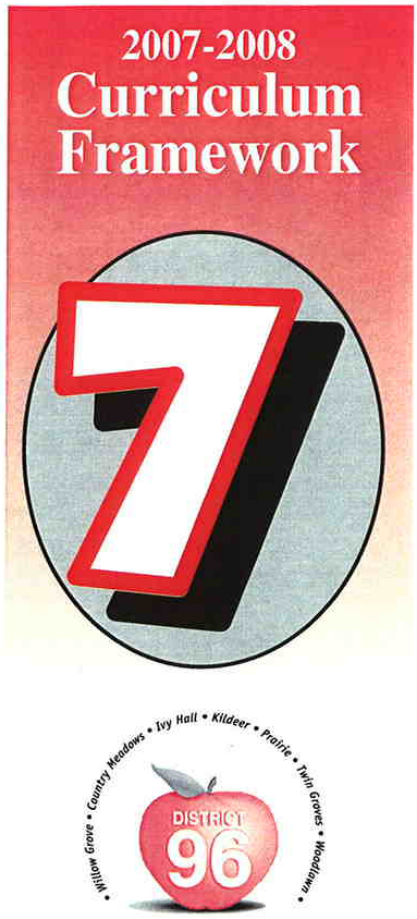
Twin Groves Middle School, Illinois

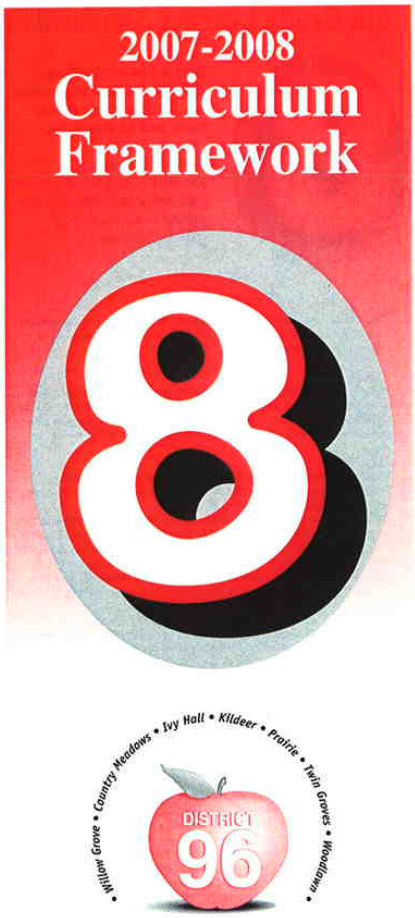
Topic: National Math Panel: Critical Foundations for Algebra
Practice: Mathematics Preparation for Algebra

Twin Groves Middle School follows the curriculum frameworks set forth by the district, Kildeer Countryside School District 96. This document is an excerpt from the all-subject curriculum frameworks that the district publishes in brochure format. The framework includes standards organized by topic and course level (e.g., honors) at each grade level. Through a process of vertical alignment and consensus among teachers carried out at the district level, the power and supporting standards were developed for each grade level. The curriculum framework guides instruction and assessment.

Power standards are the essential content knowledge and skills students should know and be able to do. Supporting standards are additional content knowledge and skills that contribute to the mastery of power standards. Because Illinois state standards in mathematics are so numerous, the curriculum framework in mathematics is especially important for focusing instruction.







Kildeer Countryside School District 96

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6th Grade Learner Standards

Bold = Power Standards: Essential content knowledge and skills students should know and be able to do.

Italics = Supporting Standards: Additional content knowledge and skills that contribute to the mastery of power standards.

Mathematics

1. **Demonstrate calculations of decimals and fractions.**
2. **Apply knowledge of whole number decimals and fractions to real life situations.**
3. **Students will be able to demonstrate knowledge of number sense.**
4. **Students will be able to demonstrate basic knowledge of geometry.**
5. *Demonstrate understanding of exponents.*
6. *Solve perimeter using fractions, decimals, and whole numbers.*
7. *Apply ratio, proportion, and percentage to real life situations.*
8. *Convert metric measures within the metric system.*
9. *Explain divisibility rules.*
10. *Calculate prime factorization of a number and express using exponents.*
11. *Solve problems using order of operations.*
12. *Compare and order whole numbers, decimals, and fractions, and be able to convert from one to the other.*
13. *Restate percent as fractions and decimals and vice versa.*
14. *Choose and use appropriate metric and customary measures.*
15. *Analyze problems and use the appropriate problem solving strategies.*
16. *Apply mean, median, mode, and range landmarks.*
17. *Understand and apply knowledge of factors and multiples.*
18. *Understand and apply the rules of rounding.*
19. *Demonstrate knowledge of geometric angles shapes and apply formulas.*

6th Grade Learner Standards

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Advanced Mathematics

1. **Understand, evaluate, and apply fractions, decimals, and percents.**
2. **Understand and calculate with integers.**
3. **Demonstrate and apply knowledge of number sense.**
4. **Apply basic knowledge of measurement.**
5. **Apply basic algebraic concepts.**
6. **Demonstrate basic knowledge of geometry.**
7. *Add, subtract, multiply and divide decimals, fractions and mixed numbers.*
8. *Represent fractions, decimals, and percents in equivalent form.*
9. *Order and compare decimals and fractions.*
10. *Solve problems using ratios, proportions, and rates.*
11. *Determine the probability of an event and represent it as a fraction, decimal, and percent.*
12. *Express numbers in scientific notation.*
13. *Evaluate problems using the order of operations.*
14. *Add, subtract, multiply, and divide integers.*
15. *Apply integers to real-life situations.*
16. *Identify and create arithmetic and geometric sequences.*
17. *Understand and apply factors and multiples.*
18. *Calculate mean, median, and mode of a set of numbers.*
19. *Change metric units of length, capacity, and mass.*
20. *Apply area, perimeter, and circumference formulas.*
21. *Solve one-step equations.*
22. *Solve two-step equations.*
23. *Translate simple verbal expressions into algebra.*
24. *Apply indirect measurement skills to determine angle measurements.*
25. *Identify congruent and similar polynomials.*
26. *Classify quadrilaterals.*
27. *Calculate prime factorization and express using exponents.*

6th Grade Learner Standards

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Honors Pre-Algebra

1. **Solve problems using order of operations.**
2. **Apply properties of powers, perfect squares, and square root.**
3. **Write scientific notation in standard form and standard form in scientific notation.**
4. **Solve and graph functions with two variables.**
5. **Add, subtract, multiply, and divide with rational and irrational numbers.**
6. **Simplify algebraic expressions.**
7. **Graph linear equations.**
8. **Solve two-step equations.**
9. **Solve and graph inequalities on a number line.**
10. **Plot ordered pairs on a coordinate graph in all quadrants.**
11. **Determine area and perimeter of irregular shapes.**
12. **Determine area and perimeter of basic shapes using variables.**
13. **Calculate circumference of circles.**
14. **Calculate area of circles, trapezoids, and irregular figures.**
15. **Measure angles and segments.**
16. **Classify quadrilaterals.**
17. **Use greatest common factor and least common multiples in word problems and demonstrate usage.**
18. **Calculate prime factorization of a number with and without exponents.**
19. **Calculate proportions, percent of change and simple interest.**
20. **Choose a computation method and solve problems using percents.**
21. **Solve real-life application problems using percents.**
22. **Apply pre-algebra skills in a problem-solving situation.**
23. **Demonstrate commutative, associative and distributive properties.**

7th Grade Learner Standards

Bold = Power Standards: Essential content knowledge and skills students should know and be able to do.

Italics = Supporting Standards: Additional content knowledge and skills that contribute to the mastery of power standards.

Mathematics

1. **Understand, evaluate, and apply fractions, decimals, and percents.**
2. **Understand and calculate with integers.**
3. **Demonstrate and apply knowledge of number sense.**
4. **Apply basic knowledge of measurement.**
5. **Apply basic algebraic concepts.**
6. *Add, subtract, multiply, divide, and convert between fractions and mixed numbers.*
7. *Solve problems using percents.*
8. *Represent fractions, decimals, and percents in equivalent form.*
9. *Solve problems using multiplication and division of decimals.*
10. *Order and compare decimals.*
11. *Solve problems using ratios, proportions, and rates.*
12. *Determine the probability of an event and represent it as a fraction, decimal, and percent.*
13. *Express numbers in scientific notation.*
14. *Evaluate problems using the order of operations.*
15. *Add, subtract, multiply, and divide integers.*
16. *Apply integers to real-life situations.*
17. *Identify and create arithmetic and geometric sequences.*
18. *Determine greatest common factor and least common multiple using prime factorization.*
19. *Calculate mean, median, and mode of a set of numbers.*
20. *Change metric units of length, capacity, and mass.*
21. *Convert between customary and metric units.*
22. *Apply area, perimeter, and circumference formulas.*
23. *Solve one-step equations.*
24. *Solve two-step equations.*
25. *Translate simple verbal expressions into algebra.*
26. *Create a table of values.*
27. *Graph linear equations using a table of values.*

7th Grade Learner Standards

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Advanced Pre-Algebra

1. **Represent fractions, decimals, and percents in equivalent form.**
2. **Choose a computation method and solve problems using percents.**
3. **Solve real life application problems using percents.**
4. **Apply properties of powers.**
5. **Write scientific notation in standard form and standard form in scientific notation.**
6. **Solve problems using order of operations including exponents and parentheses.**
7. **Add, subtract, multiply, and divide with rational numbers.**
8. **Simplify algebraic expressions.**
9. **Identify and apply algebraic properties.**
10. **Solve multiple step equations and equations with variables on both sides algebraically.**
12. **Graph linear equations using a table of values.**
14. **Define probability and determine the probability of independent events.**
15. **Add, subtract, multiply, and divide integers.**
16. **Graph using slope and intercept.**
17. **Solve system of equations using graphing and substitution.**
18. **Write equations of lines.**
19. **Add, subtract, multiply, and divide variable expressions including fractions.**
20. **Translate verbal expressions into algebraic expressions.**
21. **Calculate mean, median and mode of a data set.**
22. **Identify and create arithmetic and geometric sequences.**
23. **Algebraically solve problems using ratio, proportion and rates.**

7th Grade Learner Standards

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Honors Algebra I

1. **Solve problems using order of operations.**
2. **Simplify and evaluate expressions with variables.**
3. **Solve multi-step equations using fractions, decimals, and integers.**
4. **Apply equations to solve word problems.**
5. **Use appropriate formulas to solve problems.**
6. **Solve multi-step inequalities.**
7. **Use addition and subtraction in matrices.**
8. **Graph linear equations by constructing a table, using x and y intercepts, using slope-intercept form, and using the graphing calculator.**
9. **Graph and solve absolute value equations.**
10. **Write the equation of a line in slope-intercept form given the slope and 1 or 2 points.**
11. **Write the equation of a line in standard form.**
12. **Create and use linear models to solve problems.**
13. **Solve compound inequalities.**
14. **Solve absolute value inequalities.**
15. **Graph linear inequalities in 2 variables.**
16. **Solve a linear system of equations by graphing, substitution, and linear combinations.**
17. **Apply linear systems to solve problems.**
18. **Solve a system of linear inequalities.**
19. **Use the multiplication and division properties of exponents (including negatives and zero) to evaluate powers and simplify expressions.**
20. **Convert between standard numerals and numbers expressed in scientific notation.**
21. **Solve a quadratic equation by finding square roots.**
22. **Solve a quadratic equation by graphing.**
23. **Solve a quadratic equation by using the quadratic formula.**
24. **Identify the number of roots of a quadratic equation using the discriminant.**
25. **Sketch the graph of quadratic inequalities.**
26. **Add, subtract, and multiply polynomials.**
27. **Factor polynomials.**
28. **Solve polynomial equations.**
29. **Determine if a graph or table is a function.**
30. **Evaluate functions.**
31. **Calculate mean, median and mode of a set of numbers.**
32. **Determine if a function is an exponential growth or decay.**

8th Grade Learner Standards

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Basic Algebra

1. **The students will apply knowledge of algebra, integers, and equations.**
2. **The students will solve problems involving operations with rational numbers.**
3. **The students will apply knowledge of geometry and measurement.**
4. **The students will demonstrate knowledge of graphing on a coordinate plane.**
5. *Solve problems using order of operations including exponents and parentheses.*
6. *Write and evaluate variable expressions and equations.*
7. *Identify and apply algebraic properties.*
8. *Find the greatest common factor and least common multiple using variables and exponents.*
9. *Read and write numbers in scientific notation.*
10. *Find the mean, median, mode, and range of a set of data.*
11. *Represent fractions, decimals, and percents in equivalent form.*
12. *Solve problems using simple probability.*
13. *Evaluate problems using square roots.*
14. *Differentiate between rational and irrational numbers.*
15. *Apply the Pythagorean Theorem to solve problems.*
16. *Identify relations and functions through the use of tables and graphs.*
17. *Solve operational problems using positive and negative numbers.*
18. *Solve problems using the rules of exponents.*
19. *Solve operational problems using rational numbers.*
20. *Choose a computation method and solve problems using percents.*
21. *Solve real life problems using rates, ratios, and proportions.*
22. *Solve multiple-step equations and inequalities including variables on both sides.*
23. *Determine area and perimeter of basic shapes using variables.*
24. *Solve equations to find angle measures.*
25. *Classify polygons.*
26. *Plot points on the coordinate plane.*
27. *Solve and graph equations and inequalities using rational numbers.*
28. *Read and interpret graphs.*

8th Grade Learner Standards

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Advanced Algebra I

1. **Simplify and evaluate expressions with variables.**
2. **Solve multi-step equations using fractions, decimals, and integers.**
3. **Apply equations to solve word problems.**
4. **Use appropriate formulas to solve problems.**
5. **Solve multi-step inequalities.**
6. **Use addition and subtraction in matrices.**
7. **Graph linear equations by constructing a table, using x and y intercepts, using slope-intercept form, and using graphing calculator.**
8. **Graph and solve absolute value equations.**
9. **Write the equation of a line in slope-intercept form given the slope and 1 or 2 points.**
10. **Write the equation of a line in standard form.**
11. **Create and use linear models to solve problems.**
12. **Solve compound inequalities.**
13. **Solve absolute value inequalities.**
14. **Graph linear inequalities in two variables.**
15. **Solve a linear system of equations by graphing, substitution, and linear combinations.**
16. **Apply linear systems to solve problems.**
17. **Solve a system of linear inequalities.**
18. **Use the multiplication and division properties of exponents (including negatives and zero) to evaluate powers and simplify expressions.**
19. **Convert between standard numerals and numbers expressed in scientific notation.**
20. **Use exponents and scientific notation to solve real life problems.**
21. **Evaluate and approximate square roots.**
22. **Solve a quadratic equation by finding square roots.**
23. **Solve a quadratic equation by graphing.**
24. **Solve a quadratic equation by using the quadratic formula.**
25. **Identify the number of roots of a quadratic equation using the discriminant.**
26. **Sketch the graph of quadratic inequalities.**
27. **Add, subtract, and multiply polynomials.**
28. **Factor polynomials.**
29. **Understand exponential growth and decay models.**

8th Grade Learner Standards

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Honors Algebra II

1. **Simplify, evaluate, or solve expressions, equations or inequalities.**
2. **Identify, graph, and evaluate relations and functions.**
3. **Identify the parts of a linear function to write the equation of a line.**
4. **Solve systems of equations or inequalities in 2 or 3 variables.**
5. **Perform operations with matrices and use matrices to evaluate determinants.**
6. **Solve and analyze quadratic equations involving real and imaginary numbers by: graphing, factoring, completing the square, and using the quadratic formula.**
7. **Perform operations involving complex numbers.**
8. **Simplify radical expressions.**
9. **Simplify expressions or equations with rational exponents.**
10. **Perform operations on polynomials including solving and graphing polynomial equations.**
11. **Perform operations with functions and find their inverses.**
12. **Solve and graph radical functions.**
13. **Simplify, solve, and graph exponential and logarithmic functions.**
14. **Simplify and perform operations with radical expressions.**
15. **Use summation notation to find sums of arithmetic or geometric series.**